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A Study on Cultural Context Perception in Huizhou Cultural and Ecological Reserve Based on Multi-Criteria Decision Analysis

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Abstract: Tourists' environmental perception is the decisive factor of cultural tourism experience. Although this topic research is relatively common, there are essential differences between different theme tourism areas. This study selects the national Huizhou Cultural and Ecological Reserve in China as the research object, which has a diverse cultural field, a wide range of researchable levels, and research theoretical support, and focuses on the evaluation of tourists' environmental perceptions of cultural-themed tourism reserves. The research is in line with the basic consensus of the international community on the relationship between NRM conservation and sustainable development and has a positive significance for cultural conservation. In this study, nine indicators were constructed from the three dimensions of cultural perception, environmental perception, and emotional perception, including mental pleasure, experience comfort, audiovisual richness, cultural awareness, cultural diversity, cultural influence, facilities completeness, environment tidiness, and travel convenience. Questionnaires (283) were distributed, 260 of which were valid. The analytic hierarchy process (AHP) and entropy method were used to study the cultural context perception of Huizhou Cultural Ecological Reserve. The Cronbach coefficient was 0.977, the KMO value was 0.953, and the validity was 91.87%. The research results show that, first, tourists' perception level from high to low is cultural perception (0.351), environmental perception (0.349), and emotional perception (0.301). Secondly, the factors most strongly perceived by tourists are tourism convenience (0.129), cultural influence (0.126), cultural diversity (0.118), and facilities completeness (0.115). Thirdly, improving tourists' spiritual pleasure, experience comfort, audiovisual richness, cultural recognition, and environmental cleanliness is conducive to promoting tourists' perception and experience.

Keywords: Huizhou Cultural and Ecological Reserve; hierarchical analysis; entropy method; perception evaluation; cultural context

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1. Introduction

The establishment of China's cultural ecological reserves is a concrete practice to fulfill the UNESCO Convention for the Safeguarding of Intangible Cultural Heritage and an important initiative to implement the Law of the People's Republic of China on Intangible Cultural Heritage, responding to the requirements of historical development and in line with the concept of sustainable development of the international community. The construction of cultural ecological reserves is a manifestation of protecting diverse cultural forms, maintaining national cultural security and enhancing cultural soft power. Strengthening the construction of cultural ecological reserves will promote the protection and inheritance

and innovative use of culture in the region and realize the systematic, holistic, and sustainable development of culture. The study of cultural ecological reserves is not only an innovative exploration of the protection and management of NRM in China, reflecting the characteristics of Chinese social governance, but also provides Chinese experience for the protection of NRM in the world. The study is in line with the basic consensus of the international community on the relationship between NRM conservation and sustainable development, and has positive significance for promoting the conservation and inheritance of cultural heritage in the region, maintaining the balance and integrity of the cultural ecosystem, promoting comprehensive, coordinated, and sustainable economic and social development, promoting the innovative development of culture in the region, enhancing national cohesion, deepening the construction of ecological civilization, and maintaining national cultural security and other NRM conservation in the world.

As of January 2021, China has approved the establishment of 23 national experimental zones for cultural ecological protection, including seven national cultural ecological reserves. Among them, the Huizhou Cultural and Ecological Protection Experimental Zone was awarded and approved for construction by the Ministry of Culture in January 2008 and approved as a Cultural and Ecological Protection Zone in December 2019., placed in the mountainous place of Southern Anhui Province, belonging to the humid north subtropical monsoon climate, between 117°10′ and 118°55′ East longitude and 29°24′ and 30°32′ North latitude, including Huizhou District, Huangshan District, Tunxi District, Xiuning County, Qimen County, Yixian County, She County, and Jixi County (Figure 1).

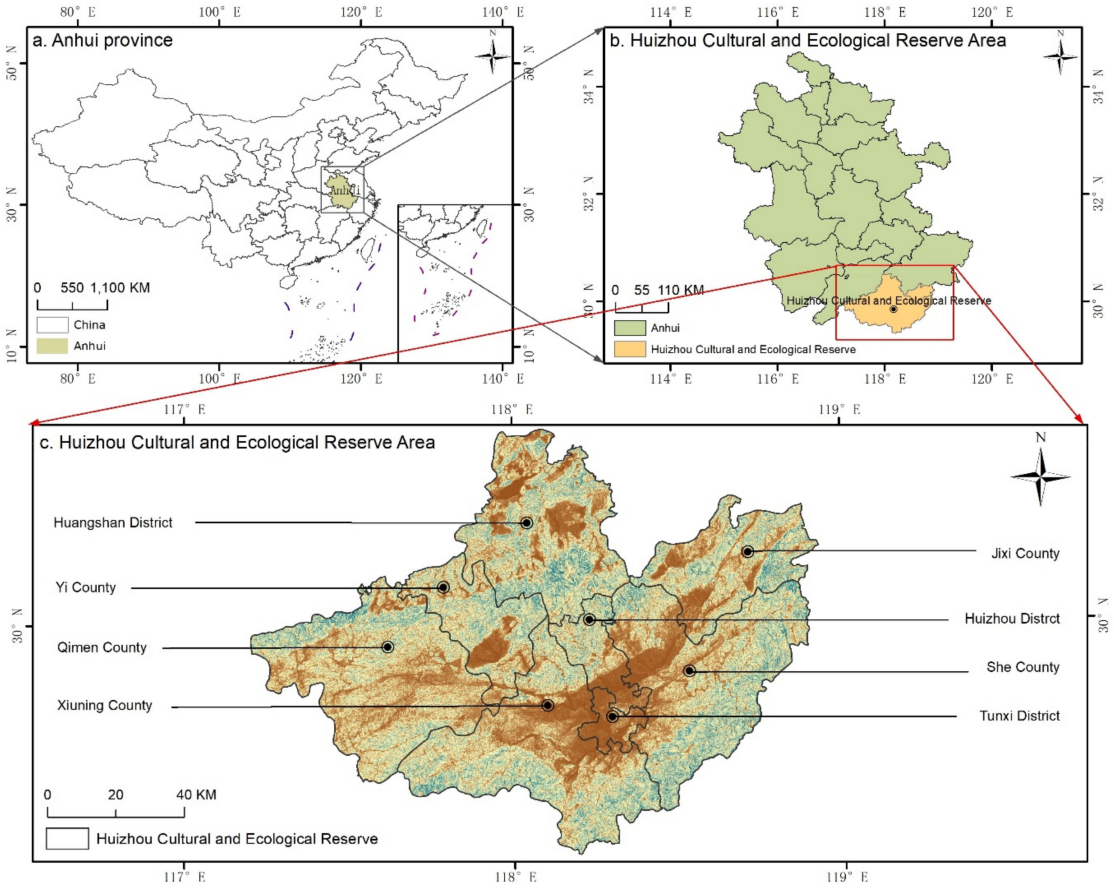

Figure 1. Huizhou Cultural and Ecological Protection Zone Map.

This study starts practice with Huizhou Cultural and Ecological Reserve, which has rich natural resources and local traditional cultural resources. The protected area has 109,582 hectares of arable land, 77,067 hectares of forest land, more than 3000 kinds of plants, 200 kinds of animals and more than 30 kinds of minerals. As of 2010, the Huizhou

Cultural and Ecological Protection Experimental Zone has established a four-level list system of intangible cultural heritage, with 15 national lists, 48 provincial lists, 106 municipal lists, and 274 lists at county (district) level and above. The Huizhou culture is rooted in Huizhou, with rich connotation and rich heritage, and has unique advantages in developing cultural tourism industry. The Huizhou culture is profound, with diverse cultural fields, and the levels and perspectives that can be studied are particularly extensive. On the basis of organizing multidisciplinary experts to conduct in-depth research and relying on the multiple academic resources of various cultural units, scientific research institutions and colleges and universities, the Huizhou Cultural and Ecological Protection Zone has established the Huizhou Cultural and Ecological Protection Zone Expert Committee and has held the "Huizhou Cultural and Ecological Protection Summit Forum", "Huizhou Studies Anhui Culture Construction Forum", "National Seminar on the Construction of Cultural Ecological Reserve", etc., which provide theoretical support for the construction of this research. In addition, the cultural tourism industry of Huizhou Cultural and Ecological Protection Zone is facing the impact and challenges of natural environment destruction, economic development and social force change in the process of development, so the reasonable development of cultural tourism industry of Huizhou Cultural and Ecological Protection Zone is urgent. The development of cultural tourism industry, the tourist travel experience, the protection and inheritance of culture are the first and foremost issues, and the tourist contextual perception is an important basis for tourism experience and evaluation [1]. The study links cultural creation with the environment, respects cultural differentiation, and analyzes the relationship between the elements of each part of the region according to the situation. The study of the cultural context perception of tourists in the Huizhou cultural and ecological reserve is of great importance for the conservation, transmission and development of the Huizhou cultural and ecological reserve. It also provides a relevant basis for tourism planning and cultural heritage protection in the process of industrialization and urbanization of other cultural and ecological reserves, ecotourism sites, ecological museums, and other cultural routes and national heritage areas.

2. Literature Review

The study of cultural contextual perception in Huizhou Cultural and Ecological Protection Zone requires a basic understanding of the relevant concepts, and the elaboration of "cultural and ecological protection zone", "tourist perception", and "cultural contextual perception" can help to understand more comprehensively the study of cultural contextual perception in Huizhou Cultural and Ecological Protection Zone. The elaboration of "cultural ecological reserve", "tourist perception" and "cultural context perception" can help to understand the cultural context perception research of Huizhou cultural ecological reserve more comprehensively. Culture is the core that supports the construction of the cultural ecological reserve, and ecology is the main concern in the process of its construction. The linkage between culture and ecology makes the production, development, inheritance and utilization of the region more systematic, comprehensive and orderly, and helps promote the sustainable inheritance of culture. The establishment of cultural ecological reserves is guided by the theory of cultural ecology. The concept and theoretical system of cultural ecology was proposed by cultural anthropologist Julian Hynes Steward in the 1960s. Culture, like nature, has an ecosystem, and human culture, together with the background from which it emerged and the environment in which it developed, constitutes a cultural ecosystem. Visitor perception has a positive effect on the development of cultural ecological reserves.

Tourist perception in tourism refers to the perceptual movement at the psychological level, that is, a process by which tourists transform the external travel information obtained in perception into their own psychological awareness. Foreign scholars began to study tourist perception in the 1970's. Tourist perception influences tourism decisions and tourist satisfaction at the end of the tour. The most typical model of perceived value is Zeithaml's "gains and losses", a four-fold meaning of perceived value. In addition, the

study includes the psychological evaluation activities felt by tourists in tourism information, tourism objects, tourism products, and tourism services. For example, iddharth Singh et al. proposed a comprehensive system of indicators used to measure tourists' perceptions in the South Sikkim Narmache region [2]. Priadaniswari analyzed the perceived level of tourist satisfaction and made recommendations for managers to improve and develop [3]. Iosif et al. assessed tourists' perceptions of wildlife groups and made suggestions for promoting wildlife conservation education and improve the visiting experience [4]. Regarding the study of factors influencing tourists' perceptions, the main ones include tourists themselves [5] and tourist destinations [6,7]. For example, Hassan et al. concluded that tourists would reduce their visit to Tamannegara National Park in Malaysia due to poor environmental perceptions.

In view of the cultural and regional nature of the Huizhou Cultural and Ecological Reserve, this study develops practice with tourists' cultural context perception. Context can be used to represent any information about an entity whether it is a person, place, or object, i.e., the context can prompt a specific behavior [8]. Marcus et al. describe context as an ongoing process that includes information processing, personal actions, and perceptual cycles [9]. The understanding of the context by the focal object is considered to be effective in improving operational performance and reducing unnecessary errors in operation [10]. Context arises as a combination of the character subject and the social environment, but also includes the character subject's own state characteristics such as age, way of thinking, life experience, and cultural qualities. The concept of situational awareness comes from the study of Schilit and Theimer and other scholars in 1994, which defined it as a collection of nearby people, objects, and locations and changes in these objects [11]. Thomas and Paul stated that the purpose of situational awareness is to obtain and use information about the device situation to provide services appropriate to that setting [12]. Situational awareness is now widely used in tourism and other industries, and constructing tourists' perceived value has been identified as a necessary measure to improve the quality of tourism services [13]. Panarello D et al. explored the relationship between tourists' perceived service quality, perceived value, and shopping behavior intentions, using the case of Chinese university students traveling abroad [14]. Damianos Gavalas et al. used a systematic approach to review the latest technologies in the field of context-awareness to propose a classification and service details of a mobile tourism recommendation system to recommend rich multimedia content and context-aware services for mobile device users to enrich the tourism experience [15]. Tsai et al. recommended theme park tours to users based on their preferences and time [16].

Cultural perception is the process by which tourists perceive the culture of a tourist place by combining sensory experiences and their own cultural background during tourism activities [17]. Cultural perceptions are divided into two categories according to different research focuses: one focuses on cultural type studies, e.g., slow culture perception [18,19], cultural value perception [20], and cultural authenticity perception [21,22]; the other focuses on specific case sites, e.g., the World Heritage sites of Uveda and Baeza [23], Anhui Huangshan [24], Zhangjiajie National Forest Park [25], and Shaolin Wushu [26,27]. Among them, the research on case sites mainly includes perceived value, perceived dimensions, and perceived influence mechanisms. For example, Wei et al. explored the relationship between the cultural worldview that tourists have and the cultural experiences they obtain using Huangshan Mountain as a case site [24]. Li used Zhangjiajie National Forest Park as an example to study that the perceived value of surface tourists has a direct and significant positive impact on social responsibility and willingness to engage in low-carbon consumption behavior [25]. Chen et al. concluded through market research that perceived value positively influences tourists' future behavioral intention [28]. Cultural and ecological reserves have unique cultural resources and profound cultural heritage, which can provide tourists with rich tourism experiences, but existing studies have paid less attention to the perceptions of tourists in cultural and ecological reserves, and the analysis of tourists' emotional characteristics is relatively weak; in addition, cultural perception stud-

ies mostly cut from a single perspective and pay less attention to the cultural context perceptions of groups.

The above is a summary of the overall research on cultural context perception. The construction of cultural ecological reserves is a new initiative for the ecological conservation of intangible cultural heritage, and the construction of cultural ecological reserves is based in practice on the experience of both the construction of natural ecological reserves and the ecological conservation of tangible cultural heritage. Cultural and ecological reserve cultural vein perception requires evaluation of specific indicators, and studies have mostly focused on the impact of heritage tourism [28], the development value of heritage tourism [29,30], conservation and heritage of tourism [8,31,32], sustainable development [33], problems in heritage tourism development [34], and operational research on practical tourism issues [35–37]. Zhang studied the competitiveness of tourism destinations in the Yangtze River Delta, China, based on TOPSIS [35]. Eugene W et al. concluded that among tourism behaviors, the perceived quality of tourists has the most significant impact on tourist satisfaction [36]. Sahabuddin M et al. found that tourist satisfaction moderates the relationship between perceived value, environmentally responsible behavior, and loyalty of a destination [37]. González Santa-Cruz studied the relationship between World Heritage cities and cultural tourism, using the Spanish city of Cordoba as a case site [38]. Although the aforementioned studies have explored tourist perceptions of cultural and ecological reserves from several perspectives, none of them have focused on the cultural contextual perception level of cultural and ecological reserves to analyze the content of tourists' perceptions.

The existing studies mainly fall into two categories: the first category is quantitative research based on questionnaire data; for example, Weng et al. used Wuyishan, a natural ecological reserve, as an example, and found that tourism interpretation is an important way to help tourists perceive heritage values [39]. Pizam analyzed a sample of 750 American households and found that tourists' image perceptions of tourist destinations are related to their level of interest and familiarity [40]; the second category combines quantitative research with qualitative research; Kim et al. analyzed the differences in the perceptions of Eastern and Western tourists of different personality characteristics of the case sites through a travelogue platform using the heritage site Jeju Island as an example [41]. Gursoy Dogan et al. explored the dimensions of heritage tourism experience based on a travel sharing website [42]; Qiu Qihang et al. used content analysis based on Sina Weibo to study structure of the cognitive elements of non-heritage tourism and their interrelationships [43]. In terms of research methods, TOPSIS [35,44,45], content analysis [41,43], BWM [46], factorial clustering [47], structural equation modeling [37], AHP [44,48,49], and entropy value method [45] were mainly used to carry out the research. For example, Xie used AHP to calculate tourist perceived service quality indicators in tourist attractions and proposed countermeasures to increase tourist return visits and improve tourism management performance [48]. Li used AHP to assess the sustainability of festival tourism [49]. Among them, AHP can deeply analyze the intrinsic connection behind the problem and decompose the target layer to construct a multi-level and multi-indicator decision system. AHP can transform subjective perceptual cognition into quantifiable parameters and has the advantage of being quantifiable, which is an excellent way to conduct cultural context perception research and is widely used. Therefore, in view of these advantages, this study uses AHP to evaluate cultural context perception studies. The entropy method is a method to objectively determine the weights of indicators based on data. Using the entropy value method to weight the indicators can calculate the weights based on the original information of the cultural context perception research indicators of the Huizhou cultural ecological reserve and reflect the hidden information of the data. Moreover, the entropy value method can enhance the variability of indicators and amplify the indicators with large differences, which helps to discover cultural heritage ecological protection measures through indicators. Therefore, the study uses the entropy value method to weight the indicators. In view of the unique advantages of AHP and entropy method in constructing the evaluation sys-

tem, this study assigns weights to the constructed evaluation index system according to the combination of subjective and objective weight determination methods, and the combination of the two can reflect all kinds of information more fully, with stronger objectivity and higher accuracy compared with the single AHP subjective weighting method. Accordingly, this study takes Huizhou Cultural and Ecological Reserve as the research object and uses AHP and the entropy value method to study tourists' perception of cultural context of Huizhou Cultural and Ecological Reserve based on the cultural nature of the Cultural and Ecological Reserve, in order to provide theoretical basis for the formulation of service strategy of Huizhou Cultural and Ecological Reserve.

3. Methods

This study takes the Huizhou Cultural and Ecological Reserve as a case. Huizhou has a rich cultural heritage, and its tangible and intangible cultural heritages are very rich and show diverse characteristics. With the acceleration of urbanization, modernization, and globalization, these intangible cultural heritages are under increasing impact, and it is urgent to carry out the construction of the national Huizhou cultural ecological reserve.

3.1. Research Methodology

Hierarchical analysis is a multi-criteria decision-making method that was proposed by Thoma at the University of Pittsburgh in the early 1970's. The method combines qualitative textual expression with quantitative numerical comparison, quantitative analysis as a guide, and mathematical model as a tool, which can effectively avoid the subjective one-sidedness of demand transformation in the analysis and decision making of complex problems through the systematic and modeled analysis of limited data samples. As a psychological evaluation theory and method with comprehensive validity characteristics, the method can be used to draw more convincing conclusions through the detailed division of research problems by the evaluation system it constructs. Currently, the method has been commonly used in tourism research and has yielded rich results.

AHP is a subjective assignment method, and entropy method is a method for objectively determining index weights based on data, and subjective assignment has strong interpretation, which can be combined with objective weight assignment methods to obtain weight assignments that are both objective and consistent with common sense judgment. In view of the unique advantages of these two methods in constructing the evaluation system, this study uses AHP and entropy method to assign weights to the evaluation index system according to the combination of subjective weights and objective weights to derive the evaluation of cultural context perception of Huizhou cultural ecological reserve.

3.2. Evaluation Index System Construction

The indicators are divided into three parts, based on the national and relevant industry standards, combined with the actual development of Huizhou cultural and ecological reserve, referred to the relevant previous research, fully considered the current direction of the development of Huizhou cultural and ecological reserve, sorted out and summarized the indicators related to the theme, and finally determined the Huizhou cultural and ecological reserve cultural context perception research evaluation index system. With emotional perception B1, cultural perception B2, and environmental perception B3 as the criterion layers, the cultural context perception research evaluation system A of the Huizhou cultural and ecological reserve was constructed and then stratified again according to the relevant attributes to form nine scheme layers (Table 1).

(1) Emotional perception

Emotional nature is the essence of tourism experience [50], and emotional experience is central in the tourism experience [51]. He et al. argued that positive emotions can help tourists improve their subjective well-being and show a significant positive correlation with tourist satisfaction [52]. Amelung analyzed the impact of climate on the tourism industry from the perspective of climate comfort [53]; Rojas et al. point out the key moder-

ating role of tourism experience in tourist satisfaction, using heritage tourism sites as an example [54]; In addition, it has been suggested that the visual-auditory interaction further extends to the overall quality of life of the traveler, increasing passenger satisfaction and loyalty [55,56]. Accordingly, this study constructs emotional perception indicators from mental pleasure C1, experiential comfort C2, and audiovisual richness C3 for the Huizhou Cultural and Ecological Reserve (Table 1).

(2) Cultural perception

Cultural perception is a key part of the tourism experience and has a role to play in current and future visitor behavior, tourism satisfaction, and tourism loyalty [57]. Mokoena argues that tourists' knowledge of local culture leads to higher travel satisfaction [58]. Chi et al. pointed out that human tourism resources are a direct motivation and reason for tourists to choose a destination and are one of the most critical components affecting the sustainability of a tourism destination [59]. Bujdosó outlined the complex relationship between culture, heritage, tourism, economy, etc. [60]. Brunt examined the socio-cultural impact of tourism on heritage sites [61]. Accordingly, this study constructs cultural perception indicators from cultural recognition C4, cultural diversity C5, and cultural influence C6 for the Huizhou Cultural and Ecological Reserve (Table 1).

(3) Environmental Perception

Environmental perception take part a key role in the travel experience, as tourists are significantly affected by the environmental factors in the tourist destination[62]. Wu et al. incorporated the idea of scenic ecology into wetland planning, which, in turn, has a positive effect on people's physical and mental health and aesthetic level [63]. Hanna et al. found that the "emotional connection to nature" caused by the aesthetics of the natural environment was the reason for the improvement of tourists' mood through rooting theory [64]. Jamal et al. found through their study that the value of facilities was a major factor in the perceived value of community-based family visitors [65]. Thompson concluded that transportation and travel had a role in tourist satisfaction, tourist behavior, and tourism development [66]. Accordingly, this study constructs environmental perception indicators from facility completeness C7, environmental tidiness C8, and travel convenience C9 for Huizhou Cultural and Ecological Reserve (Table 1).

Table 1. Research index system of cultural context perception in the Huizhou Cultural Ecological Reserve.

Target Layer	Guideline Layer	Name of Sound Source	References
A: Environmental perception of Huizhou Cultural and Ecological Conservation Area	B1:Emotional Perception	C1:Spiritual pleasure	Aho, S. K. (2001) [50] Lyu, J., Mao, Z.,(2018) [51]
		C2:Experience comfort	He, X., Su, L. (2020) [52] Amelung, B.(2014) [53]
		C3:Audiovisual richness	de Rojas, C. (2008) [54] Waitt, G. (2010) [55]
	B2:Cultural Perception	C4:Cultural Recognition	Xiang, Z. (2010) [56] Li, Y.-Q. (2020) [57]
		C5:Cultural Diversity	Mokoena, L. G. (2020) [58] Chi, C. G.-Q. (2008) [59]
		C6:Cultural Impact	Bujdosó, Z. (2015) [60] Brunt, P. (1999) [61]
	B3:Environmental Perception	C7:Facility Completeness	Gifford, R. (2014) [62] Wu, G. (2016) [63]
		C8:Environmental neatness	Hanna, P. (2019) [64]
		C9:Convenience of travel	Jamal, S. A. (2011) [65] Thompson, K. (2007) [66]

3.3. Design of Questionnaires

The research questionnaire on the perception of cultural context in Huizhou Cultural and Ecological Reserve requires the use of an appropriate questionnaire method. The study uses a nine-level Likert scale to obtain the intensity of respondents' attitudes. Due to the subjective nature of visitors' perception evaluation of the cultural context of Huizhou Cultural and Ecological Reserve, there is an intensity difference between each questionnaire score, and the Likert scale is the typical method used for this difference, and the use of this method for the visitors' perception evaluation questionnaire has been generally accepted by scholars. The questionnaire consists of two sections, firstly, the basic information of the respondents, including their gender, age, education level, and whether they have visited the Huizhou Cultural and Ecological Reserve. The second sections were based on an extensive literature review of cultural context perception in cultural ecological reserves, and nine attributes were selected to assess the cultural context perception in Huizhou cultural ecological reserves. The nine attributes were assessed through a questionnaire survey. The questionnaire was in the form of a scale, and the questions were set following the principles of clear questionnaire content, accurate and intuitive wording, and appropriate number of questions. Each question consisted of a group of statements, and the scores were divided into 1, 2, 3, 4, 5, 6, 7, 8, and 9 in order of the degree of effect evaluation, and each score represented the visitors' evaluation of this group of statements (Table 2).

Table 2. Description of the indicator conversion questionnaire.

Program Level	Description
C1: Spiritual pleasure	Do you think the Huizhou Cultural and Ecological Reserve gives you spiritual pleasure?
C2: Experience comfort	How comfortable do you think the Huizhou Cultural and Ecological Reserve is for you to experience?
C3: Audiovisual richness	What do you think of the audiovisual richness of the Huizhou Cultural and Ecological Reserve?
C4: Cultural Recognition	How do you think the Huizhou Cultural and Ecological Reserve gives you cultural recognition?
C5: Cultural Diversity	What do you think about the cultural diversity of the Huizhou Cultural and Ecological Reserve?
C6: Cultural Impact	What do you think of the cultural impact of the Huizhou Cultural and Ecological Reserve?
C7: Facility Completeness	Do you think the facilities of the Huizhou Cultural and Ecological Reserve are complete?
C8: Environmental neatness	Do you think the environmental tidiness of the Huizhou Cultural and Ecological Reserve?
C9: Convenience of travel	How easy do you think it is to travel around the Huizhou Cultural and Ecological Reserve?

4. Statistics and Analysis

A total of 283 open-ended questionnaires were distributed, screening out invalid questionnaires with too short a questionnaire time and no tourism history of Huizhou Cultural and Ecological Reserve, 260 valid questionnaires were recovered, with an efficiency rate of 91.87%. Among the basic profile of the respondents (Table 3), the proportion of men and women was 41.54% and 58.46%, respectively. The highest percentage of age is 19–30 years old, accounting for 64.23% of this option, followed by 31–50 years old, accounting for 16.15% of the total, indicating that the main body of the current tourists is the middle-aged and young people with a certain income base. The education level of the surveyed tourists is relatively high, among which 80% of the total number of samples are undergraduate and graduate students and above. Subsequently, frequency analysis, AHP hierarchical analysis, and entropy weight analysis were conducted on the 260-sample data. The weight values of each index were obtained, and the consistency test was completed.

Table 3. Basic information of the investigator.

Basic Information	Itemize Basic Information	Number	Percent
Gender	Male	108	41.54%
	Women	152	58.46%
Age	18 years of age and below	27	10.38%
	19~30 years of age	167	64.23%
	31~50 years of age	42	16.15%
	Over 51 years of age	24	9.23%
Education background	Junior high school or below	8	3.08%
	High School Degree	44	16.92%
	Undergraduate degree	135	51.92%
	Graduate student or above	73	28.08%

4.1. Confidence and Validity Analysis

Credibility studies use factor analysis research methods to demonstrate the level of validity of research data using KMO, commonality, variance, and factor loading coefficient values. Among them, the KMO value can determine the appropriateness of information extraction, and the commonality value can screen out unreasonable research options.

(1) Reliability analysis

The reliability judgment criterion assesses the internal consistency of the obtained factors through the reliability coefficient Cronbach's α, which is used to measure the questionnaire reliability of the Likert scale questions. If the measured value of Cronbach's α is Equal to or more than 0.7, indicating high stability or reliability of the scores measured by the scale. The questionnaire data were imported into SPSSAU statistical software for factor analysis, and the α value of Cronbach was 0.977 (Table 4), which is greater than or equal to 0.9, indicating that the scale of this study is very credible.

Table 4. Cronbach reliability analysis.

Number of Items	Number of Samples	Cronbach *a* Coefficient
9	260	0.977

(2) Validity analysis

Validity value validity, that is, the validity of the questionnaire test results. a KMO value between 0.8 and 1.0 indicates that the sampling is adequate, while a value between 0.7 and 0.8 is still acceptable. The questionnaire da *a*a were imported into SPSSAU statistical software for reliability testing, and the KMO value of the test statistic for the sample data was 0.953, significance level p less than 0.05 (Table 5), passing the validity test and satisfying the conditions for the applicability of factor analysis.

Table 5. KMO and Bartlett tests.

KMO		0.953
Bartlett's sphericity test	Approximate cardinality	3264.094
	df	36.000
	p-value	0.000

4.2. Weight Calculation and Consistency Test

The audience of Huizhou Cultural and Ecological Reserve is tourists, and the 9-level scale in the AHP method is used as the evaluation scale, and tourists make comparative judgment on the preference degree of each element. Based on the evaluation scale in the hierarchical analysis method, the comparison and assignment of each element in the index

system is completed, and SPSSAU defaults to the calculation of the mean value of the analyzed items, and the relative importance size is obtained through the mean information, and the judgment matrix needed for AHP is constructed, and the data is transformed into a matrix to reach the quantitative research results, so that the weights can be calculated. Therefore, it means that the larger the number is, the higher its relative importance will be. Let there be n cultural context perception indicators of Huizhou cultural ecological reserve, which are B1...,B_i...,B_j...,B_n, so that the project elements are compared in pairs between the operations and transformed into the judgment matrix form as follows.

$$B = \begin{bmatrix} 1 \cdots b_{1i} \cdots b_{1j} \cdots b_{1n} \\ b_{i1} \cdots 1 \cdots b_{ij} \cdots b_{in} \\ b_{j1} \cdots b_{ji} \cdots 1 \cdots b_{jn} \\ b_{n1} \cdots b_{ni} \cdots b_{nj} \cdots 1 \end{bmatrix} = \left(b_{ij}\right)_{n \times n} \tag{1}$$

By the Perron-Fresenius theorem, the matrix B has a unique non-zero eigen root, i.e., the largest eigen root corresponding to the eigenvector

$$B_w = \lambda_{max} w \tag{2}$$

To calculate the feature vectors using the sum-product method, proceed as follows. Normalize the data in B by column.

$$\overline{b}_{ij} = b_{ij} / \sum_{k=1}^{n} b_{kj} (i, j = 1, 2, \cdots, n) \tag{3}$$

The weight vector is obtained by dividing the summed vector by n.

$$\widetilde{w}_i = \sum_{j=1}^{n} \overline{b}_{ij} (i = 1, 2, \cdots, n) \tag{4}$$

The weight vector is obtained by dividing the summed vector by n.

$$\widetilde{w}_i = \widetilde{w}_i / n \tag{5}$$

Maximum characteristic root.

$$\lambda_{max} = \frac{1}{n} \sum_{i=1}^{n} \frac{(B_w)_i}{w_i} \tag{6}$$

According to the above formula, the weight values of the indicators at the criterion level and the scheme level can be calculated and ranked in importance to complete the design decision.

The study forms evaluation indicators by decomposing the problem with comparative judgments and performs weighting calculations to obtain the combined weight values of program-level indicators. The consistency of matrix B is tested and calculated as follows.

$$CR = \frac{CI}{RI} \tag{7}$$

where CI stands for consistency index; CR stands for consistency ratio; RI stands for average random consistency index.

$$CI = (\lambda_{max} - n) / (n - 1) \tag{8}$$

From this, CR can be calculated, and when CR < 0.1, it means that the calculation result of matrix B is qualified and valid; otherwise, it should be modified. According to the above ideas, the judgment matrix is established, and the weights are calculated for the

cultural context perception research indicators of Huizhou cultural ecological reserve, and the calculation results are presented in Tables 6–9.

Table 6. Criterion-level judgment matrix and weight value of cultural context perception in Huizhou Cultural Ecological Reserve.

A	B1	B2	B3	w_i	λ_{max}	CI	CR
B1	1.000	1.000	1.023	0.337			
B2	0.990	1.000	1.013	0.334	3.000	0.000	0.000
B3	0.977	0.987	1.000	0.329			

Table 7. Judgment matrix and weight value of "emotion perception".

B1	C1	C2	C3	w_i	λ_{max}	CI	CR
C1	1.000	1.008	1.010	0.335			
C2	0.993	1.000	1.002	0.333	3.000	0.000	0.000
C3	0.991	0.998	1.000	0.332			

Table 8. Judgment matrix and weight value of "cultural perception".

B2	C4	C5	C6	w_i	λ_{max}	CI	CR
C4	1.000	1.007	1.023	0.337			
C5	0.993	1.000	1.015	0.334	3.000	0.000	0.000
C6	0.978	0.985	1.000	0.329			

Table 9. Judgment matrix and weight value of "environmental perception".

B3	C7	C8	C9	w_i	λ_{max}	CI	CR
C7	1.000	0.983	0.997	0.331			
C8	1.017	1.000	1.014	0.337	3.000	0.000	0.000
C9	1.003	0.986	1.000	0.322			

From the results of the table, CR < 0.1, which passes the consistency test. From this, the program level elements can be weighted and calculated to find the weight values of the program level indicators (Table 10).

Table 10. Research index description weight of cultural context perception in Huizhou Cultural Ecological Reserve.

Program Level	Eigenvector	Weighting Value	Maximum Eigenvalue CI	CI Value
C1: Spiritual pleasure	1.017	0.113		
C2: Experience comfort	1.009	0.112		
C3: Audiovisual richness	1.007	0.112		
C4: Cultural Recognition	1.011	0.112		
C5: Cultural Diversity	1.004	0.112	9.000	0.000
C6: Cultural Impact	0.988	0.110		
C7: Facility Completeness	0.982	0.109		
C8: Environmental neatness	0.998	0.111		
C9: Convenience of travel	0.984	0.109		

The weight values of guideline level indicators and target level indicators were calculated (Table 11), and the statistical graph of the weight values of the visitor perception level (Figure 2).

Table 11. Comprehensive weight of cultural context perception research index of Huizhou Cultural Ecological Reserve.

Target Layer	Guideline Layer	Weighting Value	Name of Sound Source	Weighting Value
A: Environmental perception of Huizhou Cultural and Ecological Conservation Area	B1: Emotional Perception	0.337	C1: Spiritual pleasure	0.113
			C2: Experience comfort	0.112
			C3: Audiovisual richness	0.112
	B2: Cultural Perception	0.334	C4: Cultural Recognition	0.112
			C5: Cultural Diversity	0.112
			C6: Cultural Impact	0.110
	B3: Environmental Perception	0.329	C7: Facility Completeness	0.109
			C8: Environmental neatness	0.111
			C9: Convenience of travel	0.109

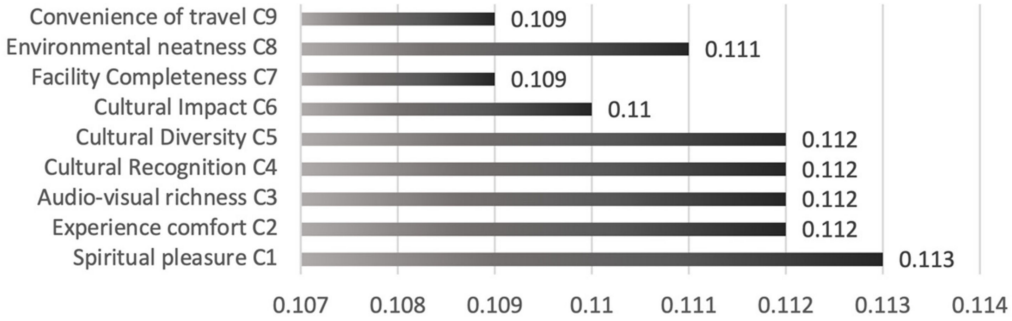

Figure 2. Statistical chart of weight values.

4.3. Determination of Index System Weights Based on Entropy Value Method

Before carrying out the entropy method calculation, the indicators should first be non-negative, and since there are no negative indicators in this study, the extreme difference standard method is used to normalize the indicators, and the calculation formula is as follows.

$$Y_{ij} = \frac{X_{ij} - X_{i_{min}}}{X_{i_{max}} - X_{i_{min}}} \tag{9}$$

Calculating entropy value of the j the indicator E_j.

$$E_j = -\frac{1}{\ln m} \sum_{i=1}^{m} P_{ij} \ln P_{ij} \tag{10}$$

where E_j represents the entropy value of the j the index, n represents the number of evaluation indexes, and ln represents the natural logarithm function.

Calculate the entropy weight E_j of the j the indicator.

$$W_j = \frac{1 - E_j}{k - \sum_{j=1}^{k} E_j} \tag{11}$$

The weights of the indicators for the study of cultural context perception in the Huizhou Cultural and Ecological Reserve calculated by the entropy value method are shown in Table 12.

Table 12. Index weights of cultural context perception research in Huizhou Cultural Ecological Reserve based on the entropy method.

Number of Items	Information Entropy Value E_j	Information Utility Value	Weighting Factor W_j
C1	0.996	0.004	0.094
C2	0.996	0.004	0.101
C3	0.996	0.004	0.103
C4	0.996	0.005	0.106
C5	0.995	0.005	0.113
C6	0.995	0.005	0.128
C7	0.995	0.005	0.117
C8	0.996	0.005	0.105
C9	0.995	0.006	0.132

4.4. Combined Weights Based on the Combination of Hierarchical Analysis and Entropy Weighting Method

Since the hierarchical structure model constructed in the paper has more elements in the scheme level and the generated judgment marix is of order 9, the data are processed by the method of combined application of AHP and entropy value method. The combined weights can be calculated as follows, based on the weighted results of the indicators of the two calculation methods mentioned above.

$$C_j = \frac{w_i W_j}{\sum_{i=1}^{n} w_i W_j} \tag{12}$$

where w_i and W_j denote the weights of evaluation indicators calculated by hierarchical analysis and entropy value method, respectively. The results of both subjective and objective assignments were synthesized and calculated, and the results are expressed in Table 13.

Table 13. Two weighting methods and comprehensive weight results.

Number of Items	w_i	W_j	C_j
C1	0.113	0.094	0.095
C2	0.112	0.101	0.102
C3	0.112	0.103	0.104
C4	0.112	0.106	0.107
C5	0.116	0.113	0.118
C6	0.110	0.128	0.126
C7	0.109	0.117	0.115
C8	0.111	0.105	0.105
C9	0.109	0.132	0.129

The combined weight values of criteria level indicators and target level indicators were calculated (Table 14), and the statistical graph of the combined weight values of visitor perception levels (Figure 3).

Table 14. Comprehensive weight of cultural context perception research index of Huizhou Cultural Ecological Reserve.

Target Layer	Guideline Layer	Combined Weight Value C_j	Name of Sound Source	Combined Weight Value C_j
A: Environmental perception of Huizhou Cultural and Ecological Conservation Area	B1: Emotional Perception	0.301	C1: Spiritual pleasure	0.095
			C2: Experience comfort	0.102
			C3: Audiovisual richness	0.104
	B2: Cultural Perception	0.351	C4: Cultural Recognition	0.107
			C5: Cultural Diversity	0.118
			C6: Cultural Impact	0.126
	B3: Environmental Perception	0.349	C7: Facility Completeness	0.115
			C8: Environmental neatness	0.105
			C9: Convenience of travel	0.129

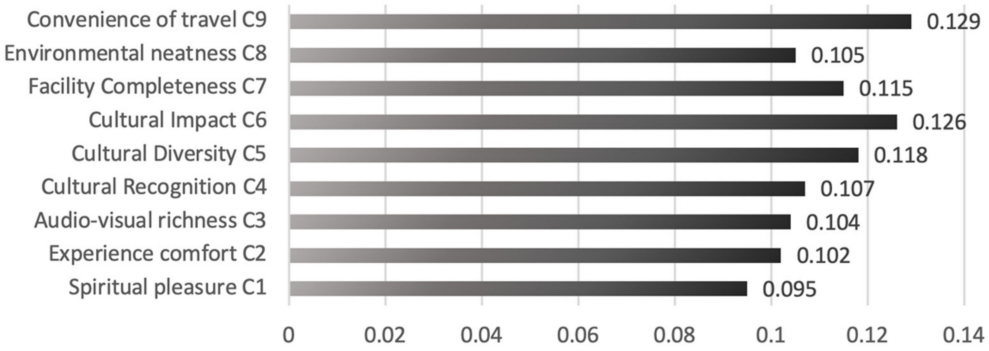

Figure 3. Statistical chart of integrated weight values.

4.5. Analysis of Data

After calculating the data collected from the questionnaire, it can be obtained that the evaluation indexes B1 emotional perception, B2 cultural perception, and B3 environmental perception of the AHP-based Huizhou Cultural Ecological Reserve have a combined weight of 0.337, 0.334, and 0.329, respectively, in relation to the evaluation of the target layer A; C1 mental pleasure, C2 experience comfort, and C3 audiovisual richness have a weight of 0.335, 0.332, and 0.332, respectively, in relation to the evaluation of B1 emotional The weights of C1 mental pleasure, C2 experience comfort, and C3 audiovisual richness to evaluate B1 emotional perception are 0.335, 0.332, and 0.332, respectively; the weights of C4 cultural recognition, C5 cultural diversity, and C6 cultural influence to evaluate B2 cultural perception are 0.335, 0335, and 0.329, respectively; the weights of C7 facility completeness, C8 environmental neatness, and C9 travel convenience to evaluate B3 environmental perception are 0.331, 0.331, and 0.329, respectively, and 0.331, 0.337, and 0.331, respectively; the weighting of C1 mental pleasure, C2 experience comfort, C3 audiovisual richness, C4 cultural recognition, C5 cultural diversity, C6 cultural influence, C7 facility completeness, C8 environmental cleanliness, and C9 travel convenience to the evaluation of target layer A are 0.113, 0.112, 0.112, 0.112, 0.112, and 0.112. The order of importance of the scheme layers are C1 mental pleasure, C4 cultural recognition, C2 experience comfort, C3 audiovisual richness, C5 cultural diversity, C8 environmental cleanliness, C6 cultural influence, C9 travel convenience, C7 facility completeness, i.e., the tourists' perception of Huizhou Cultural and Ecological Reserve is C1 mental pleasure, C4 cultural recognition, C2 experience comfort, C3 audiovisual richness, C5 cultural diversity, C8 environmental cleanliness, C6 cultural influence, C9 travel convenience, and C7 facility completeness. The highest perception evaluation of C1 spiritual pleasure of emotional perception, followed by C4 cultural recognition, C2 experience comfort, C3 audiovisual richness, C5 cultural diversity, and lower perception evaluation of C6 cultural influence, C9 travel convenience, and C7 facility completeness.

The two methods, AHP and entropy value method, were combined to finally arrive at the comprehensive weight value of the cultural background perception research evaluation index B1 emotional perception, B2 cultural perception, and B3 environmental perception were 0.301, 0.351, and 0.349, respectively, for the evaluation of target layer A. The comprehensive weights of C1 mental pleasure, C2 experiential comfort, and C3 audiovisual richness for the evaluation of B1 emotional perception were The overall weights of C1 mental pleasure, C2 experience comfort, and C3 audiovisual richness to evaluate B1 emotional perception are 0.316, 0.339, and 0.346, respectively; the overall weights of C4 cultural recognition, C5 cultural diversity, and C6 cultural influence to evaluate B2 cultural perception are 0.305, 0.336, and 0.359, respectively; the overall weights of C7 facility completeness, C8 environmental cleanliness, and C9 travel convenience to evaluate B3 environmental perception are 0.330, 0.301, and 0.349, respectively; the overall weights of C7 facility completeness, C8 environmental cleanliness, and C9 travel convenience to evaluate The combined weights of C1 mental pleasure, C2 experience comfort, C3 audiovisual richness, C4 cultural recognition, C5 cultural diversity, C6 cultural influence, C7 facility completeness, C8 environmental cleanliness, and C9 travel convenience to evaluate the target layer A are 0.095, 0.102, 0.104, 0.107, 0.118, and 0.118, respectively. The highest perceived evaluation of C9 travel convenience of the environmental perception of the cultural ecological reserve is followed by C6 cultural influence, C5 cultural diversity, C7 facility completeness, and C4 cultural recognition, while the perceived evaluation of C8 environmental cleanliness, C3 audiovisual richness, C2 experience comfort, and C1 spiritual pleasure is lower.

5. Conclusions

Data analysis has the advantage of being quantifiable and can reasonably reflect research questions to a certain extent, can transform abstract visitor perceptions into quantifiable parameters, and can reflect hidden information from the data to enhance perceived variability and make the research analyzable, but still requires specific analysis for specific issues that the data cannot fully reflect. The level of tourists' perception of the cultural context in the study area can reflect the demand and recognition of services related to the Huizhou Cultural and Ecological Reserve during the trip, and the following conclusions were drawn.

(1) In the criterion layer, the visitors' perception level of the cultural context of Huizhou Cultural and Ecological Reserve is ranked from highest to lowest as B2 cultural perception (0.351), B3 environmental perception (0.349), B1 emotional perception (0.301), and the weight of cultural perception is 0.351, which is the factor with the highest level of visitors' perception, followed by environmental perception, and emotional perception occupies the least weight in the criterion layer, and visitors' perception is the lowest. Cultural perception and environmental perception are in the top two positions, which to a certain extent indicates that the Huizhou Cultural and Ecological Reserve has followed the principle of holistic protection, and the human and natural resources have been developed in a more coordinated and balanced way. The highest degree of cultural perception indicates that the overall cultural experience function of Huizhou Cultural and Ecological Reserve has been developed more fully, and tourists can generally feel the cultural value of Huizhou Cultural and Ecological Reserve, to a certain extent, thanks to the rich cultural resources of Huizhou Cultural and Ecological Reserve and the scientific and effective development and dissemination by the government. However, the cultural service functions such as environmental perception and emotional perception still have more room for exploration, among which environmental perception is generally higher than emotional perception, to a certain extent, due to the distinctive locality of Huizhou Cultural and Ecological Reserve, which is located in the mountainous area of Southern Anhui, surrounded by high mountains and peaks in the area, and the relatively closed geographical location makes the well-preserved and distinctive ecological environment to meet the tourists' expectation of its ecological environment.

(2) In the scheme layer, the top four indicators in order of weight are C9 travel convenience (0.129), C6 cultural influence (0.126), C5 cultural diversity (0.118), C7 facility completeness (0.115), and their combined weight values are all above 0.115, indicating that the cultural diversity, cultural influence, facility completeness and convenience of the Huizhou Cultural and Ecological Reserve play a certain degree of role in the good tourism experience of tourists. It shows that the cultural diversity, cultural influence, facility completeness and travel convenience of Huizhou Cultural and Ecological Reserve play a certain role in the good tourism experience of tourists. Among them, the high perception of travel convenience and facility completeness is probably due to the development and construction of the Cultural and Ecological Protection Experimental Zone since January 2008, the government has continuously increased the capital investment and has a more complete transportation system and infrastructure, which makes tourists fully feel the convenience during the trip; while the cultural influence and cultural diversity may be due to the government's scientific and effective construction of the cultural heritage protection system of the Huizhou Cultural and Ecological Protection Zone. The scientific and effective construction of the protection system has preserved the diversity of Huizhou culture to the maximum extent and made the tourists fully feel the influence of Huizhou culture through museums, libraries, cultural museums, science and technology museums, traditional festivals, skill demonstrations and interest centers, etc. The high perception of cultural diversity also indicates the high density of the existence of cultural heritage in Huizhou Ecological Reserve, which enables tourists to experience a variety of cultural resources.

(3) In B1 emotional perception, its program-level indicators C1 spiritual pleasure (0.095), C2 experiential comfort (0.102), and C3 audiovisual richness (0.104) rank at the bottom of the weight of the nine indicators in the program level, all lower than 0.115, among which C1 spiritual pleasure (0.095) is much lower than the other eight program-level indicators, to a certain extent, this indicates that the cultural services and functional facilities of the Huizhou cultural ecology are relatively weak in the protected areas based on the perception of recreational emotions. In B2 cultural perception, the weight share is higher than that of B1 emotional perception B3 environmental perception, in which C4 cultural recognition degree (0.107) is low. It indicates that the overall cultural experience function of Huizhou Cultural and Ecological Reserve has been more fully developed, but there is still some space for the development of cultural service function and related initiatives based on cultural recognition in Huizhou Cultural and Ecological Reserve. In terms of B3 environmental perception, its C8 environmental tidiness (0.105) is the lowest, much lower than C7 facility completeness (0.115) and C9 travel convenience (0.129), indicating that there is room for the Huizhou Cultural and Ecological Reserve to enhance the environmental awareness of tourists, strengthen the service initiatives of environmental tidiness, and improve the sanitation service facilities of the scenic spot.

6. Discussion

In view of this, efforts should be made to broaden the ways of cultural context perception of tourists related to Huizhou Cultural and Ecological Reserve, improve the level of tourists' perception of cultural context related to Huizhou Cultural and Ecological Reserve, and enhance their willingness to travel choice. The discussion is as follows.

(1) Enhance visitors' emotional perception and improve recreational service facilities.

The soft environment supports the comfort of visitor experience, so scenic spots should make more efforts to improve infrastructure construction, strive to improve scenic traffic, strengthen the security management of scenic spots, improve the level of guide interpretation and scenic services, etc. The degree of experience of strengthening humanistic care will be incorporated into the development and construction of scenic spots to provide satisfactory recreation programs for special groups such as the elderly and children. At the same time, we should strengthen the service quality of the scenic service personnel and improve the service attitude, and rectify unreasonable businesses, so as to improve the comfort level of visitor experience. Secondly, through the use of text, audio, video, digital

multimedia, and other modern means to the intangible cultural heritage of real, systematic, and comprehensive records to establish archives and databases, and its cultural connotation through micro-video, micro-film all-round, and three-dimensional shows. It also highlights the unique culture of the ecological reserve and presents the Huizhou Cultural and Ecological Reserve and the characteristic folk culture more vividly, imaginatively, and intuitively in front of people; increases the audiovisual richness of tourists; and makes the Huizhou cultural and ecological reserve perceivable and knowable.

(2) Improving cultural recognition of tourists and designing cultural experience activities.

Participation in cultural experience activities is the way for tourists to directly perceive cultural services, and it is the way of perceiving cultural services with high participation and acceptance of tourists, and it can increase the promotion of festivals and events by organizing various forms of cultural experience activities of local culture, such as Huizhou Cultural Art Exhibition and Performance, Huizhou Handicraft Exhibition and Sale, and Huizhou Folk Culture and Art Festival, to show folklore, festivals, and local feelings for tourists and to develop regional hidden folk culture explicitly. For example, in order to cultivate the cultural brand and enhance the popularity of the culture of Gegong, the Gegong Cultural Ecological Reserve has organized large-scale events such as the Qinghai Gegong Cultural Tourism Festival, the Gegong Thangka Painting Competition and the Gegong Cultural Forum to develop the region's hidden folk culture explicitly. For example, in the process of promoting the construction of another Chinese cultural and ecological reserve, Minnan Cultural and Ecological Reserve, Quanzhou City, Fujian Province, China, focuses on the productive transformation of non-heritage projects, so that, by 2020, Quanzhou City will have 420 arts and crafts enterprises above a certain scale, with a sales value of 120 billion yuan. This will effectively promote the construction of the Southern Fujian Cultural and Ecological Reserve. In addition, the organizational guarantee for the development of folk culture tourism should be strengthened, which not only reduces the adverse effects of variable factors, increases the tourist's length of stay in the tourist destination, and promotes inter-ethnic cross-cultural exchanges, but also avoids the commercialization of an art form due to over-exploitation, creates a favorable atmosphere, and improves the cultural recognition of tourists.

(3) Promote environmental awareness among visitors and improve the interpretation and signage system.

Improvements in terms of ecological conservation this helps to improve the ecotourism experience [67] Protected areas can improve the scenic interpretation of the signage system to do positive guidance to tourists' environmental behavior. Through driving tour guides, playing environmental protection science videos, adding ecological protection popularization windows in visitor centers, adding trash cans and placing interpretive signs in each attraction, etc. to promote cultural ecology and the construction of cultural ecological protection experimental zones, and strive to enhance visitors' awareness of cultural heritage and the corresponding cultural space environmental protection, thus improving environmental neatness.

The study quantitatively evaluates the cultural context perception of the Huizhou Cultural and Ecological Reserve from two aspects: subjective assignment and objective weighting assignment. This paper firstly summarizes the important influencing elements of cultural context perception in Huizhou Cultural Ecological Reserve and the domestic and international literature on the evaluation of ecological influencing elements from different aspects, quantifies nine evaluation indexes of C1 mental pleasure, C2 experience comfort, C3 audiovisual richness, C4 cultural recognition, C5 cultural diversity, C6 cultural influence, C7 facility completeness, C8 environmental neatness, and C9 travel convenience, and using the hierarchical analysis and entropy value method, the evaluation results of the cultural context perception of the Huizhou Cultural Ecological Reserve with high objectivity were obtained.

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